

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
8 July 2004 (08.07.2004)

PCT

(10) International Publication Number
WO 2004/056537 A3

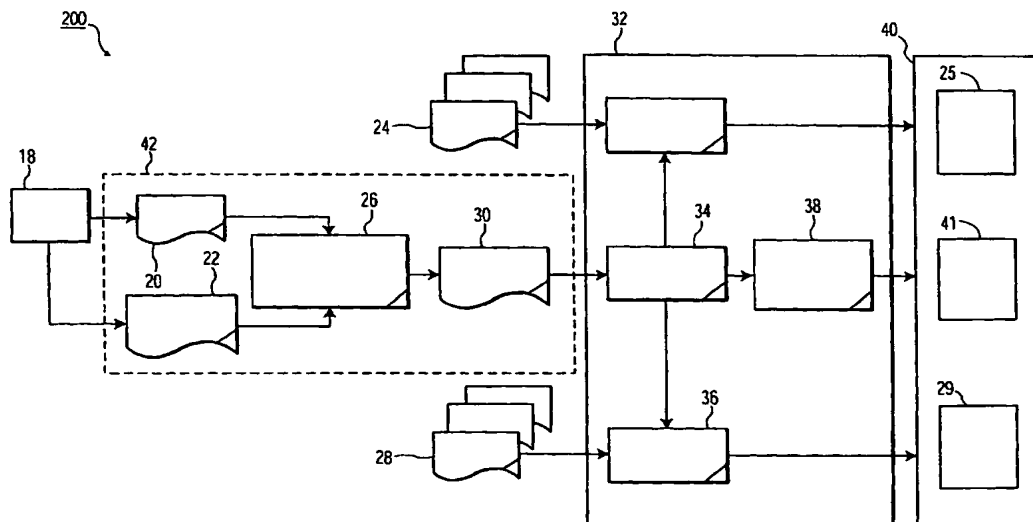
- (51) International Patent Classification⁷: A63H 11/00, G06N 3/00, B62D 57/00
- (21) International Application Number: PCT/IB2003/005646
- (22) International Filing Date: 4 December 2003 (04.12.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/434,549 19 December 2002 (19.12.2002) US
- (71) Applicant (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): ALSAFADI, Yasser [US/US]; P.O. Box 3001, Briarcliff Manor, NY 10510-8001 (US). CHIPARA, Octav [US/US]; P.O. Box 3001, Briarcliff Manor, NY 10510-8001 (US). YASSIN, Amr [US/US]; P.O. Box 3001, Briarcliff Manor, NY 10510-8001 (US).
- (74) Common Representative: KONINKLIJKE PHILIPS ELECTRONICS N.V.; c/o Keegan, Frank, P.O. Box 3001, Briarcliff Manor, NY 10510-8001 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR CONTROLLING A ROBOT



(57) Abstract: The present invention is directed to a computer-implemented system and method for controlling robots (41) using a high-level programming language. The invention defines three programming languages, i.e., two high-level languages and a low-level language. A first high-level programming language is referred to herein as a robot scenario language (RSL) (20), in which an end-user (18) creates a robotic presentation (40) in terms of high-level behaviors or actions. A second high-level language, referred to herein as a robot behavior language (RBL) comprised of templates for describing how each high level behavior or action in the high-level (RSL) language is to be transformed or mapped into low-level language commands for directly controlling the hardware of the robot (41). The low-level language referred to herein as a robot hardware language (RHWL).



CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK,

EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— with international search report

(88) Date of publication of the international search report:

21 October 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

In International Application No.

PC/IB 03/05646

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A63H11/00 G06N3/00 B62D57/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G05B B25J G06N A63H B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 02/29715 A (ANNAPOORNA NAYAK PANGAL ; KENT RIDGE DIGITAL LABS (SG); SITIRAM RANGAN) 11 April 2002 (2002-04-11)</p> <p>page 1, lines 11-26 page 2, lines 7-18 page 8, lines 31-34 page 9, line 5 - page 10, line 17 page 11, line 18 - page 13, line 30 page 16, line 11 - page 19, line 15 figure 2; table 5</p> <p style="text-align: center;">----- -/--</p>	1-15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *F* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *G* document referring to an oral disclosure, use, exhibition or other means
- *H* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *Z* document member of the same patent family

Date of the actual completion of the international search

5 July 2004

Date of mailing of the international search report

22/07/2004

Address and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Orobitg Oriola, R

INTERNATIONAL SEARCH REPORT

Inventor's Application No
PCT/JP 03/05646

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SIMMONS R ET AL: "A task description language for robot control" INTELLIGENT ROBOTS AND SYSTEMS, 1998. PROCEEDINGS., 1998 IEEE/RSJ INTERNATIONAL CONFERENCE ON VICTORIA, BC, CANADA 13-17 OCT. 1998, NEW YORK, NY, USA, IEEE, US, 13 October 1998 (1998-10-13), pages 1931-1937, XP010311412 ISBN: 0-7803-4465-0 page 1931, column 1, line 1 - page 1933, column 1, line 12 page 1934, column 1, line 49 - page 1934, column 2, line 14 page 1936, column 1, line 3 - page 1937, column 1, line 16 abstract figures 1,2,4,7	1-3,6-15
A	US 2002/049833 A1 (KIKINIS DAN) 25 April 2002 (2002-04-25) paragraph '0002! paragraphs '0013! - '0020! paragraphs '0116! - '0128! paragraphs '0153! - '0156! paragraphs '0170! - '0199! figures 9,13,15	1-15
A	US 2001/032278 A1 (BROWN DAVID W ET AL) 18 October 2001 (2001-10-18) paragraph '0016! paragraphs '0034! - '0046! paragraphs '0051! - '0070! paragraphs '0089! - '0094!	1-15
A	US 5 519 814 A (RODRIGUEZ GUILLERMO ET AL) 21 May 1996 (1996-05-21) column 1, lines 16-35 column 6, line 17 - column 7, line 50 column 8, line 16 - column 9, line 13 figure 7	1-3, 6-10, 12-15
A	US 2002/038168 A1 (OKITA AYAKO ET AL) 28 March 2002 (2002-03-28) paragraph '0002! paragraphs '0013! - '0020! paragraphs '0048! - '0050! paragraphs '0126! - '0181! paragraphs '0210!, '0211! figures 5-15	1,2, 6-10, 12-14
A	JP 2002 283259 A (SONY CORP) 3 October 2002 (2002-10-03) the whole document -/-	1,2, 6-10, 12-14

INTERNATIONAL SEARCH REPORT

Inventor's Application No

Patent No 03/05646

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	<p>-& US 2003/187653 A1 (COSTA GABRIEL ET AL) 2 October 2003 (2003-10-02)</p> <p>paragraphs '0001!, '0002! paragraphs '0014! - '0041! paragraph '0106! paragraphs '0115! - '0126! claims 1,5 figures 3-8</p>	1,2, 6-10, 12-14
A	<p>US 2002/095445 A1 (ALSAFADI YASSER ET AL) 18 July 2002 (2002-07-18) paragraphs '0003! - '0007! figure 1</p>	4,5
A	<p>ADLER S ET AL: "Extensible Stylesheet Language (XSL), Version 1.0 - W3C Recommendation 2001" INTERNET ARTICLE, 'Online! 15 October 2001 (2001-10-15), XP002286174 Retrieved from the Internet: URL:www.w3.org/TR/2001/REC-xsl-20011015/xslspecRX.pdf> 'retrieved on 2004-06-21! abstract page 17 - page 25</p>	4,5
A	<p>CLARK J: "XSL Transformations (XSLT), Version 1.0 - W3C Recommendation 16 November 1999" INTERNET ARTICLE, 'Online! 16 November 1999 (1999-11-16), XP002286175 Retrieved from the Internet: URL:www.w3.org/TR/1999/REC-xslt-19991116> 'retrieved on 2004-06-21! abstract pages 4-6</p>	4,5
A	<p>BRAY T ET AL: "Extensible Markup Language (XML) 1.0 - W3C Recommendation 10-Feb-98" INTERNET ARTICLE, 'Online! 10 February 1998 (1998-02-10), XP002286176 Retrieved from the Internet: URL:www.w3.org/TR/1998/REC-xml-19980210.pdf> 'retrieved on 2004-06-21! abstract page 5</p>	4,5

INTERNATIONAL SEARCH REPORT

Int. Patent Application No
PC 03/05646

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0229715	A	11-04-2002	WO 0229715 A1	11-04-2002
US 2002049833	A1	25-04-2002	US 6076109 A	13-06-2000
			US 5727159 A	10-03-1998
			US 5746602 A	05-05-1998
			CN 1304510 T	18-07-2001
			EP 1076867 A1	21-02-2001
			JP 2002513972 T	14-05-2002
			WO 9957657 A1	11-11-1999
			US 6319010 B1	20-11-2001
			CN 1114157 B	09-07-2003
			EP 0956528 A2	17-11-1999
			JP 2000514940 T	07-11-2000
			US 6243596 B1	05-06-2001
			WO 9836344 A2	20-08-1998
			US 2003120786 A1	26-06-2003
			US 6535922 B1	18-03-2003
			US 2001021664 A1	13-09-2001
			CN 1218561 A	02-06-1999
			DE 69719963 D1	24-04-2003
			DE 69719963 T2	04-12-2003
			EP 0892947 A2	27-01-1999
			JP 11508715 T	27-07-1999
			WO 9738389 A2	16-10-1997
			CN 1218570 A	02-06-1999
			EP 0885442 A1	23-12-1998
			JP 11505054 T	11-05-1999
			WO 9732300 A1	04-09-1997
US 2001032278	A1	18-10-2001	AU 9792198 A	27-04-1999
			WO 9917854 A1	15-04-1999
US 5519814	A	21-05-1996	US 5303384 A	12-04-1994
US 2002038168	A1	28-03-2002	JP 2001353678 A	25-12-2001
JP 2002283259	A	03-10-2002	CN 1460050 T	03-12-2003
			WO 02076686 A1	03-10-2002
			US 2003187653 A1	02-10-2003
US 2003187653	A1	02-10-2003	JP 2002283259 A	03-10-2002
			CN 1460050 T	03-12-2003
			WO 02076686 A1	03-10-2002
US 2002095445	A1	18-07-2002	WO 0244937 A2	06-06-2002
			EP 1402411 A2	31-03-2004
			JP 2004515005 T	20-05-2004